

WE CLAIM:

1. A mobile station adapted to participate in wireless PMP (point to multi-point) communications using a cellular spectral resource, the mobile station being further adapted to participate in wireless P2P (peer-to-peer) communications using said cellular spectral resource.
2. A mobile station according to claim 1 wherein said cellular spectral resource comprises a downlink PMP band, and an uplink PMP band, wherein the mobile station is adapted to participate in wireless PMP (point to multi-point) communications using the downlink PMP band for receiving and using the uplink PMP band for transmitting, the mobile station being further adapted to participate in wireless P2P (peer-to-peer) communications using the PMP uplink band for both transmitting and receiving in a TDD (time division duplex) manner.
3. A mobile station according to claim 2 comprising:
 - a transmitter for transmitting PMP communications and P2P communications on the uplink PMP band;
 - a first receiver for receiving PMP communications on the downlink PMP band;
 - a second receiver for receiving P2P communications on the uplink PMP band.
4. A mobile station according to claim 3 adapted to listen to PMP communications from the network on the downlink PMP band with the first receiver for maintenance purposes while transmitting P2P communications and while receiving P2P communications with the second receiver.
5. A mobile station according to claim 2 comprising:

a transmitter for transmitting PMP communications and P2P communications on the uplink PMP band;

a receiver for receiving PMP communications on the downlink PMP band, and for receiving P2P communications on the uplink PMP band.

6. A mobile station according to claim 5 adapted to listen to PMP communications from the network on the downlink PMP band for maintenance purposes only while transmitting P2P communications.

10 7. A mobile station according to claim 5 wherein said receiver is a software defined receiver.

8. A mobile station according to claim 1 further adapted to maintain linked state transitions between states for PMP communications and at least one state for P2P communications.

9. A mobile station according to claim 8 wherein the states for PMP communications comprise dormant, standby and active, and wherein P2P communications are permitted when the mobile station is in one of the PMP states dormant and standby.

20 10. A mobile station according to claim 1 adapted to periodically interrupt P2P communications to perform maintenance for PMP communications.

11. A mobile station according to claim 1 adapted to transition into P2P communications independent of network control.

12. A mobile station according to claim 11 adapted to transition into P2P communications independent of network control by directly coordinating a setup of a P2P communications link with another mobile station.

13. A mobile station according to claim 12 adapted to coordinate the setup of a P2P communications link with another mobile station by:

in response to a user selection, transmitting an P2P
5 request to the another mobile station on a P2P access channel;

receiving an acknowledgement from the another mobile station.

14. A mobile station according to claim 1 adapted to transmit a frame format which includes a time slot for PMP
10 communications and a time slot for P2P communications.

15. A mobile station according to claim 1 adapted to transition into P2P communications under network control.

16. A mobile station according to claim 1 adapted to transition into P2P communications under network control
15 transparent to a user of the mobile station.

17. A mobile station according to claim 16 adapted to:

receive a direction from the network to enter P2P communications with another mobile station;

in response to said direction, coordinate set up of
20 P2P communications with the another mobile station;

while in P2P communications, listen to PMP transmissions from the network for maintenance purposes.

18. A mobile station according to claim 1 wherein both P2P communications and PMP communications are CDMA-like
25 communications.

19. A mobile station according to claim 1 further adapted to perform signalling to set up P2P communications with another

mobile station using an access channel having a defined long code mask announced by a network controlling said spectral resource.

20. A mobile station according to claim 19 adapted to use
5 a first long code mask for P2P transmissions to another mobile station, and a second long code mask for PMP communications to the network.

21. A mobile station according to claim 1 further adapted
to perform at least one of rate control and power control for
10 P2P communications in cooperation with the other mobile station.

22. A mobile station according to claim 1 further adapted
to perform at least one of rate control and power control for
P2P communications under control of the network.

15 23. A mobile station according to claim 1 adapted to initiate P2P communications with a default power, and to request authorization to use additional power and/or channel resources from the network should P2P communications not be successful.

20 24. A mobile station according to claim 1 further comprising at least one steerable antenna which is steered for use in P2P communication or PMP communications.

25 25. At least one network element adapted to participate in PMP communications with a plurality of mobile stations, the at least one network element being adapted to:

determine when a pair of mobile stations which are communicating with each other are sufficiently close together for P2P communications;

direct the pair of mobile stations to start communicating with each other using P2P communications.

26. A cellular network comprising the at least one network element of claim 25.

5 27. A cellular network according to claim 26 wherein the at least one network element comprises a base station transceiver which determines a pair of mobile stations which are communicating with each other are sufficiently close together for P2P communications due to their being located in a
10 coverage area serviced by the base station transceiver.

28. A cellular network according to claim 26 wherein the at least one network element comprises a base station controller and a plurality of base stations which determine a pair of mobile stations which are communicating with each other
15 are sufficiently close together for P2P communications due to their being located in a coverage area of base stations serviced by the base station controller.

29. A cellular network according to claim 25 adapted to send and transmit CDMA-like signals.

20 30. A method comprising: /

a mobile station participating in wireless PMP (point to multi-point) communications using a cellular spectral resource;

the mobile station participating in wireless P2P
25 (peer-to-peer) communications using said cellular spectral resource.

31. A method according to claim 30 wherein said cellular spectral resource comprises a downlink PMP band, and an uplink PMP band, wherein the mobile station participates in wireless

PMP (point to multi-point) communications using the downlink PMP band for receiving and using the uplink PMP band for transmitting, the mobile station participates in wireless P2P (peer-to-peer) communications using the PMP uplink band for both transmitting and receiving in a TDD (time division duplex) manner.

32. A method according to claim 31 further comprising:

the mobile station listening to PMP communications on the downlink PMP band for maintenance purposes while transmitting P2P communications and while receiving P2P communications.

33. A method according to claim 31 further comprising:

maintaining linked state transitions between states for PMP communications and at least one state for P2P communications.

34. A method according to claim 31 further comprising:

receiving a direction from the network to enter P2P communications with another mobile station;

in response to said direction, co-ordinating set up of P2P communications with the another mobile station;

while in P2P communications, listening to PMP transmissions for maintenance purposes.